MEMORANDUM

TO: Ernie Carlsen, IDWR Program Manager
FROM: Tony Olenichak, Water District #1 Program Manager
DATE: August 1, 2008
SUBJECT: Delivery of Mitigation Storage to Surface Water Diversions

As we discussed in a 7/22/08 teleconference with the State Office, there currently isn't a procedure for distributing mitigation storage provided by owners of newly issued or transferred water rights to water users being impacted by these new or transferred rights. Recently, there have been conditions placed on some new water rights requiring the owner of the right to "provide storage for the watermaster to release into the Snake River or tributary to mitigate for depletion of river flow resulting from the diversion of this right." However, neither the daily depletion amount nor the location of the depletion has been provided to the Watermaster for these conditions which prevent him from delivering mitigation storage to the appropriate diversions during the irrigation season.

For example, if a new groundwater diversion depletes 10 acre-feet from the Snake River, the depletion could impact several different diversions depending on which diversions are diverting water and how much natural flow is currently in the river. Impacted diversions will change throughout the season, year to year, and possibly from day to day depending on the amount of daily depletion assigned to each reach and the amounts canals are currently diverting.

Additionally, the location of where the depletion occurs can affect the amount and location of diversions impacted. Also be aware depletions may impact reservoir storage water rights. For example, if an additional 10 acre-feet of reach-gain would have occurred in the Heise reach during June 2008, it would have resulted in an additional 10 acre-feet accruing to the Palisades storage water right and eventually would have been allocated to Palisades storage spaceholders for the 2008 irrigation season. Any depletions occurring during the non-irrigation season can also affect storage rights.

Once the daily amounts and locations of depletions are supplied to Water District #1, they can easily be entered into the daily water-right accounting each day to mitigate for the natural-flow that otherwise would have been delivered to diversions or reservoir storage rights. Each reach in the water-right accounting would contain a "depletion diversion" representing the daily depletions in each reach, allowing for the exchange of storage water for natural-flow and providing mitigation to other impacted diversions. *Note: It was pointed out in the teleconference the groundwater model only has 6 or 7 reaches whereas the Water District #1 surface accounting program has 36 reaches for the Snake River and its tributaries. Therefore a diversion could be added to the Water District #1 accounting for each the 6 or 7 reaches that correlate to the heads of the 6 or 7 reaches identified in the groundwater model.*

Here's an example of how the simple modification to the water-right accounting program would work, exchanging storage for natural flow when distributing mitigation for river depletions:

Let us assume we are in the middle of the irrigation season and zero water is spilling out the end of the system at Milner Dam. Therefore, on this day, all the natural flow and storage in the river system is being delivered to diversions. The first step taken by the water-right accounting is computing the natural-flow (reach gain) in each river reach using the following equation:

Reach Gain = Outflow – Inflow + Diversions + Change in Storage + Evaporation - Exchange Pumping

Let's focus on one reach where:

- There isn't any reservoir or groundwater exchange wells in the reach (i.e. the change in storage, evaporation, and groundwater exchange pumping are all zero);
- The reach has four surface diversions totaling 775 cfs;
- The USGS (inflow) gage at the head of the river reach is 12,500 cfs;
- The USGS (outflow) gage at the end of the river reach is 11,900 cfs.

The reach-gain or natural-flow would be calculated as 175 cfs (11,900 cfs – 12,500 cfs + 775 cfs = 175 cfs) for this example river reach.

In this example, we also find after computing the reach-gain for all 36 reaches in Water District #1 using the same equation, the cumulative reach-gain (total natural flow) for all 36 reaches is computed as 16,100 cfs. On this day, there are 27,300 cfs of diversions diverting water, meaning there is 11,200 cfs of storage water being diverted in addition to the 16,100 cfs of natural flow diverted on this day. *Note: Correspondingly, the change in physical reservoir system contents on this day would also equal 11,200 cfs.*

Now, let's say it has been determined by the groundwater model that Bob Smith's well is depleting the example reach by 2 cfs, so we add a diversion to the reach representing the depletion (impact) from his well. The parameters for computing the reach gain would be the same as above, with the additional 2 cfs of diversion:

- There isn't any reservoir or groundwater exchange wells in the reach (i.e. the change in storage, evaporation, and groundwater exchange pumping are still zero);
- The reach has four surface diversions of 775 cfs plus 2 cfs of diversion representing the river depletion from Bob Smith's well, which results in a total reach diversion of 777 cfs;
- The USGS (inflow) gage at the head of the river reach is still 12,500 cfs;
- The USGS (outflow) gage at the end of the river reach is still 11,900 cfs.

The available natural-flow in the reach would be calculated as 177 cfs (11,900 cfs – 12,500 cfs + 777 cfs = 177 cfs) after the 2 cfs of depletion has been added to the reach diversions. All other river, reservoir, and diversion data remains unchanged. The total natural flow (sum of reach gains) becomes 16,102 cfs after the 2 cfs of additional

diversion has been added. And, after distributing the natural flow to all 27,302 cfs of diversions, the water right accounting program would show a total of 16,102 cfs of natural flow and 11,200 cfs of storage delivered to all diversions.

By adding the 2 cfs of Bob Smith's depletion diversion, you've delivered a portion of the total 11,200 cfs of the reservoir change-in-storage to Bob Smith's diversion, and increased the natural flow delivered to all other diversions by 2 cfs without changing anything physically in the system (i.e., you've neither created nor destroyed water, but simply changed the distribution). The physical reservoir change-of-storage is still 11,200 cfs and the total amount of storage delivered to all diversions is still 11,200 cfs. However, 2 cfs of the total storage delivered on that day was delivered to Bob Smith's depletion diversion in exchange for 2 cfs of additional natural flow delivered to all other diversions within the system. The impact from the depletion caused by Bob Smith's well has been mitigated, natural-flow diversions have received an additional 2 cfs, and Bob Smith's storage allocation has been reduced by 2 cfs (4 acre-feet).

One diversion for each impacted reach can be added to the water-right accounting containing the sum of all depletions for that reach. For example, let's say Bob Smith's well impacts the Heise reach by 2 cfs, Tom Jackson's well impacts the Heise reach by 1 cfs, and Mary Martin's well impacts the reach by 3 cfs each day. The total depletion diversion in the Heise reach would then be 6 cfs per day. This would result in 6 cfs (12 acre-feet) of natural flow exchanged for storage and delivered to diversions that are impacted by those depletions each day.

There are some downsides to using this accounting method to distribute mitigation for river depletions:

- Daily depletions could only be entered into the water right accounting program when there is enough storage assigned from the water-user supplying storage to exchange for natural flow. If the water-user supplying storage mitigation did not have an available storage supply, his diversion would need to be curtailed. Otherwise, the water-right accounting would show the water-user is impacting other surface water-users by depleting their natural-flow supply and not providing an equal amount of storage in exchange.
- Total depletion cannot exceed the total storage mitigation supplied. If it does, someone must be responsible for insuring the groundwater diversions without an adequate mitigation supply are curtailed when the storage supply has been depleted. *Note: Water users that depend on Palisades storage or rental storage occasionally do not know their precise storage allocation (if any) until mid-season.*
- Depletion amounts must be broken into daily increments for delivery in the daily water-right accounting.
- IDWR must be responsible for providing Water District #1 with the daily depletion data (including daily amounts and locations) prior to the irrigation season so the impacts can be mitigated when water is diverted and/or delivered.

- IDWR must ensure the amount of storage to be mitigated from each entity can be provided by that entity. The total depletion cannot exceed the total storage supplied by those entities.
- This method of providing mitigation only works for diversions located physically where storage can be delivered or exchanged. Mitigation (exchange of storage for natural flow) cannot be provided to diversions on tributaries where all the natural flow is diverted and storage cannot be delivered or exchanged during the irrigation season.
- The water-right accounting is published each day during the irrigation season, and any data entered into the water-right accounting can be viewed and scrutinized by the public (some people don't see this as a downside, but just be aware it is happening).

If these procedures to distribute mitigation storage are found to be acceptable to Lyle Swank (Water District #1 Watermaster) and implemented in the water-right accounting, IDWR needs to provide Water District #1 with the following information prior to distributing the water:

1) The name of the water-right owner(s) providing mitigation;
2) The daily amount of depletion(s) in each river reach;
3) The assignment of storage being provided for mitigation.